

# **Musculoskeletal Health and Injury Prevention**



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# Objectives

- **Describe Common Training-Related Musculoskeletal Injuries**
- **Identify Musculoskeletal Injury Prevention Strategies**
- **Discuss Strategies for Optimizing Musculoskeletal Health**



# Musculoskeletal Injuries

- **Greatest health threat to military readiness is musculoskeletal injuries**
- **>25 million days of limited duty**
- **431 injuries/1000 persons**





# **Common Training Related Musculoskeletal Injuries**



# The Injury Paradox

- **Low Fitness is a principal factor for injury...**
- **Yet, physical training participation is directly related to musculoskeletal injury!**
- **We need to train smarter!**





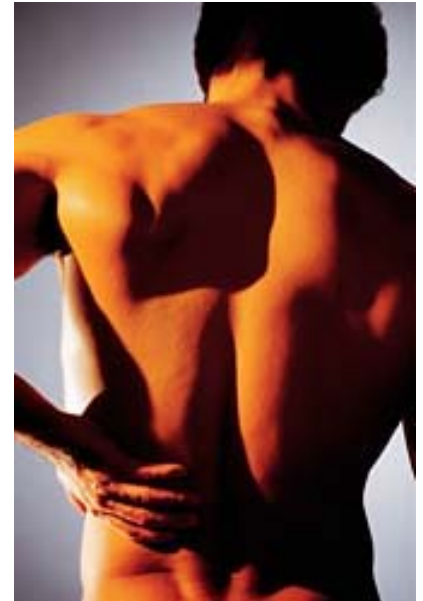
# Ankle Sprain

- 7 sprains/year per 100 persons
- Rule of 85s: 85% of ankle injuries are sprains, with 85% involving the lateral ankle.
- Ankle sprains represent 21 to 53% and 17 to 29% of all basketball and soccer injuries respectively.
- Ankle sprains are thought to be the most common traumatic injury in sports.



# Low Back Pain

- **Four out of five individuals has a major episode of low back pain during their lifetime.**
- **General prevalence of low back pain in the military is 25%.**
- **~ 50% of working age people admit to low back pain during the year.**
- **Back pain is a common reason exercise programs are stopped.**





# Osteoarthritis

- Osteoarthritis is the most common form of arthritis in the United States.
- Radiographic evidence of osteoarthritis is present in the majority of people over age 65; 80% of those over 75.
- Commonly cited reason for not wanting to pursue an exercise program.



# Tendon Injuries

- **Acute and chronic musculoskeletal injuries are common in new exercisers:**
  - Achilles tendon rupture
  - Hamstring strain
  - Tennis elbow
  - Rotator cuff tendinitis
- **A common theme: Too much, too soon, too fast!**





# **Musculoskeletal Injury Prevention Strategies**



# Training Guidelines

- ***Cardiorespiratory Training:***
  - Moderate intensity, aerobic physical activity (like brisk walking) for  $\geq 30$  min for 5 days/week OR vigorous intensity activity (like running)  $\geq 20$  min for 3 days/week.



# Training Guidelines

- ***Muscular Strength and Endurance:***
  - Every adult should perform activities to maintain/increase muscular strength and endurance  $\geq 2$  days/week.
    - Perform at least 1 set of 8 to 10 exercises that use all the major muscle groups.





# **Recommendations for Prevention of Physical Training Related Injuries:**

- **Results of a Systematic Evidence-Based Review by the Joint Services Physical Training Injury Prevention Work Group**



<http://champ.usuhs.mil/chprovider.html> - Educational Resources



# Recommended Interventions

- **Prevent overtraining;**
- **Perform multiaxial, neuromuscular, proprioceptive, and agility training;**
- **Wear mouthguards during high risk activities;**



# Recommended Interventions

- **Wear semi-rigid ankle braces for high risk activities;**
- **Consume nutrients to restore energy balance within 1 hour following high intensity activity;**
- **Wear synthetic blend socks to prevent blisters.**



# Interventions NOT Recommended

- **Wear back braces, harnesses, or support belts;**
- **Take anti-inflammatory medications prior to exercise.**





# **Strategies to Optimize Musculoskeletal Health**





# Priority One

- **Develop a lifetime program that includes flexibility, strengthening, and cross-training for aerobic conditioning;**
- **It is essential for optimizing musculoskeletal health, preventing chronic diseases, and minimizing chronic injuries and pain.**



# Core Stability

- **Provides several benefits, from maintaining low back health to preventing knee injury;**
- **Pilates is an alternative approach for treating non-specific low back pain.**





# Functional Movement Screening (FMS)

- **A FMS to identify weaknesses, followed by flexibility and core muscle strength training:**
  - reduced lost time due to injuries by 62% and # of injuries by 42% in firefighters over a 12 month period;
- **FMS needs to be evaluated in military settings.**

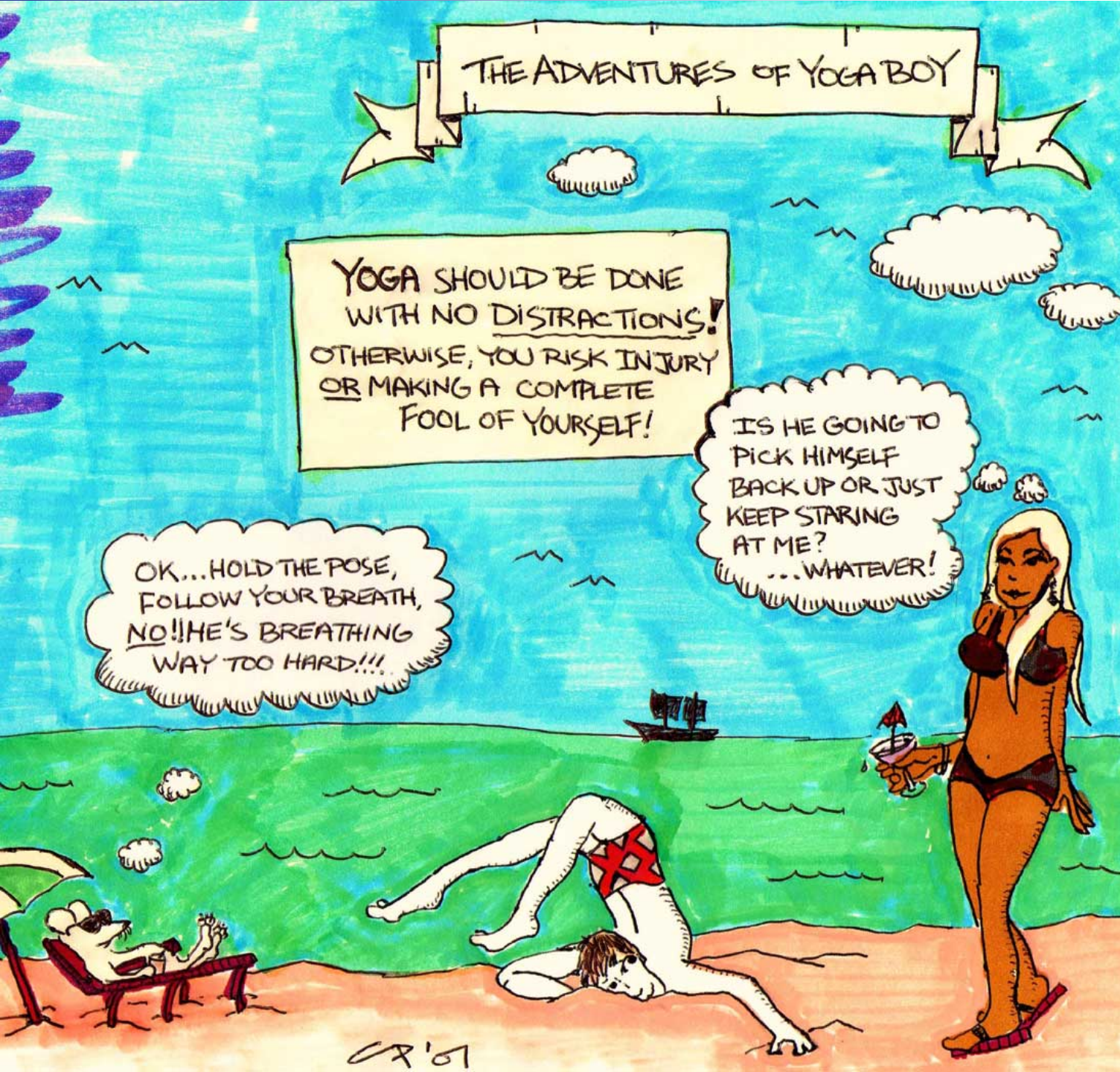


# THE ADVENTURES OF YOGA BOY

YOGA SHOULD BE DONE  
WITH NO DISTRACTIONS!  
OTHERWISE, YOU RISK INJURY  
OR MAKING A COMPLETE  
FOOL OF YOURSELF!

OK...HOLD THE POSE,  
FOLLOW YOUR BREATH,  
NO!! HE'S BREATHING  
WAY TOO HARD!!!

IS HE GOING TO  
PICK HIMSELF  
BACK UP OR JUST  
KEEP STARING  
AT ME?  
...WHATEVER!



Yoga



# Yoga and Health

- Yoga programs have been shown to reduce pain-related disability and improve spinal flexibility in patients with chronic low back pain;
- Yoga is helpful for improving functional capacity of persons with osteoarthritis.



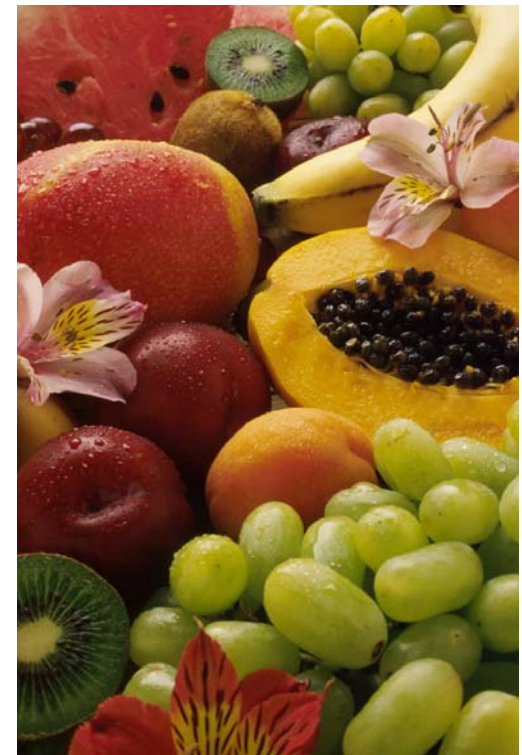
# Tai Chi and Health

- Tai Chi has been shown to enhance muscle function, balance and flexibility;
- Tai Chi may reduce pain, depression and anxiety associated with knee osteoarthritis;
- Tai Chi has the potential to reduce falls or risk of falls among the elderly.



# Nutrition and Musculoskeletal Health

- Consume fresh and colorful fruits and vegetables: 4 - 5 of each/day;
- Eat cold water fish (salmon, halibut, scallops, tuna, mackerel, cod, shrimp, snapper, and sardines)  $\geq 2x/\text{week}$ ;
- $\uparrow$  intake of anti-inflammatory foods;
- Minimize intake of alcohol, caffeine, and processed meats (lunch meats, hot dogs and sausages);
- Avoid tobacco products.





# Anti-Inflammatory Foods

- **Green vegetables**
- **Carrots**
- **Avocados**
- **Pecans**
- **Seeds**
  - Sesame
  - Flax
  - Pumpkin



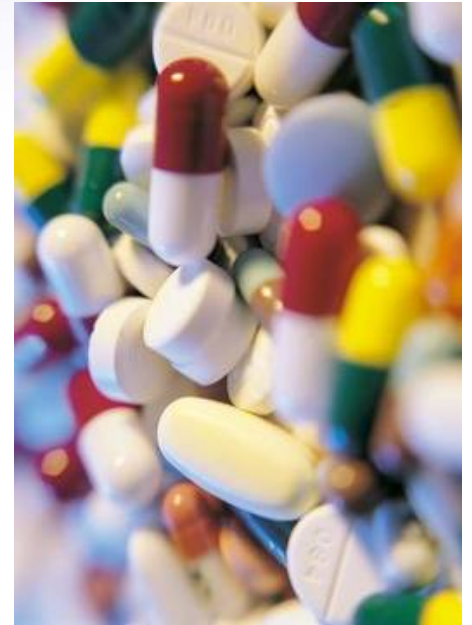
- **Oats**
- **Soy**
- **Brown rice**
- **Wheat**
- **Cold-water fish**





# Dietary Supplements

- **Glucosamine/Chondroitin sulfate**
- **Vitamins C and E**
- **Selenium**
- **Omega-3 Fatty Acids**
- **Calcium and Vitamin D**
- **Coenzyme Q10**
- **Capsaicin Cream (chili peppers)**



# Summary

## Musculoskeletal health requires:

- **A balanced training program:**

- Cardiovascular activity
- Agility and balance
- Strength (core)

- **A healthy diet:**

- Colorful fruits & vegetables
- Whole grains
- Cold water fish





# Questions?

# CHAMP

USUHS Consortium for Health  
and Military Performance

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